

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 00.100	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA416)	
International application No. PCT/ES 03/00388	International filing date (day/month/year) 25.07.2003	Priority date (day/month/year) 26.07.2002
International Patent Classification (IPC) or both national classification and IPC B01F15/04		
Applicant CIMA 27 S.L. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
 - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 8 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 20.02.2004	Date of completion of this report 03.11.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Brunold, A Telephone No. +49 89 2399-7838 

International application No. PCT/ES 03/00388

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1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

1-6 filed with telefax on 25.10.2004

1-11 filed with telefax on 25.10.2004

1/4-4/4 as published

- These elements were available or furnished to this Authority in the following language: **ENGLISH** , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☒ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- | | | | |
|-------------------------------------|------------------|---------|-------|
| <input checked="" type="checkbox"/> | the description, | pages: | 7,8 |
| <input checked="" type="checkbox"/> | the claims, | Nos.: | 12,13 |
| <input type="checkbox"/> | the drawings, | sheets: | |

**INTERNATIONAL PRELIMINARY
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5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	1-11
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

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Re Item I.5 Basis of opinion

1. Art. 34(2)(b) PCT, Rule 70.2(c) PCT

Some amendments filed with telefax dated 25.10.04 introduce subject-matter which extend beyond the content of the application as originally filed (eg. translation of application documents as filed with letter of 18.02.04), contrary to Art. 34(2)(b) PCT, cf. claim 10 line 15 as well as on page 2 line 28: "...supplied with software, and a interface...", contrary to "...supplied with **the relevant** software, and a **conventional** interface...", as originally filed.

Consequently, this IPER has been established as if these amendments had not been made, Rule 70.2(c) PCT.

Re Item V: Reasoned statement under Rule 66.2(a)(ii) PCT with regard to novelty, inventive step or industrial applicability;

Citations and explanations supporting such statement

2. STATE OF THE ART

Reference is made to the following documents:

D1: WO 94 21554 A1
D3: EP-A-0 585 9971

D2: US-A-4 335 759
D4: EP-A-0 165 0981

3. NOVELTY [Art. 33(2) PCT], INVENTIVE STEP [Art. 33(3) PCT]

- 3.1 D1, which is considered to represent the closest prior art, discloses a metering or dispensing mechanism including a plurality of storage containers, each container

having two or more metering pumps. Automated dispensing equipment operates the metering pump at the dispensing station and the turntable is thereafter indexed a smaller amount to bring the other pump associated with the same container into a dispensing position.

The problem to be solved is to provide a system for metering pasty products like paint which offers an integral solution to the problem that, when closing a valve, usually a last drop is formed which can harm the precise metering, dirty the installation and hamper the next operation. As the constructional design of the opening and closing means comprising a metering valve (cf. also fig. 1 of present application) has not been disclosed in the prior art as cited in the international search report, the subject-matter of amended **independent claim 1** is considered to be new, Art. 33(2) PCT, and to involve an inventive step, Art. 33(3) PCT.

- 3.2 D1 also discloses a metering process for the dispensing of liquid and pulverulent materials. Neither the providing of a pasty product in a container packaging with deformable walls, nor the opening of the container by opening means [comprising a lower metering valve and a sealing element as claimed in claim 1], nor the exiting of the pasty product towards said metering valve, are disclosed in D1.

The problem to be solved is to provide a process for metering pasty products like paint which offers an integral solution to the problem that, when closing a valve, usually a last drop is formed which can harm the precise metering, dirty the installation and hamper the next operation. As the process claimed comprises the use of a special constructed or designed opening and closing means, said means do also comprise a metering valve (cf. fig. 1 of present application) which has not been disclosed in the prior art as cited in the international search report, the subject-matter of amended **independent claim 11** is considered to be new, Art. 33(2) PCT, and to involve an inventive step, Art. 33(3) PCT.

4. INDUSTRIAL APPLICABILITY [Art. 33(4) PCT]

- 4.1 For the assessment of the present claims 1 to 11 on the question whether they are industrially applicable, no unified criteria exist in the PCT Contracting States. The patentability can also be dependent upon the formulation of the claims. The present application is considered to be industrially applicable, Art. 33(4) PCT, cf. also Rule 67.1(i)-(vi) PCT, PCT-Guidelines IV-4.1.

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FURTHER COMMENTS (e.g. CLARITY [Art. 6 PCT])

5.1 The following terms "...the relevant...", "...conventional...", all of amended claim 10 line 15 (cf. also remarks given under item 1 above) are vague and unclear and leave the reader in doubt as to the meaning of the technical features to which they refer, thereby rendering the definition of the subject-matter of said claim unclear (Art. 6 PCT).

5.2 The vague and imprecise statements in the description on

- page 1 line 13: "...although not exclusively...",
- page 3 lines 10, 11: "...which are purely illustrative and non-limitative in nature...",

imply that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity, Art. 6 PCT, when used to interpret them.

5.3 The term 'modlue' as given on p. 3 line 19 should be read as 'module'.

* * * * *

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DESCRIPTION**"MODULE, SYSTEM AND PROCESS FOR METERING AND MIXING PASTY PRODUCTS"**

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Technical field of the invention.-

The present invention relates to a module for the metering of pasty products, of the type comprising a tank for the pasty product, provided with pushing means for the pasty product and opening and closing means, adapted for opening and closing an outlet of aforementioned tank.

10

The present invention also relates to a process for using the metering module and the aforementioned mixing system.

The present invention is particularly, although not exclusively, for use in the metering and mixing of dyes in paint production.

15

State of the art.-

At present, the mixing of primary dyes used in the production of paint is mainly done manually, putting the previously measured amount of dye in a recipient. However, there are good number of automatic or semi-automatic metering systems in which the dye is poured from an upper tank onto a lower recipient with a loading cell which, once a predetermined weight of dye is captured, orders a valve on the higher tank to close and stop the pouring. This operation is repeated for each of the primary dyes until the mixture with the required proportions of each one has been made.

20

WO 94 21554 A1 discloses a metering mechanism according to preamble of claim 1.

25

Although these existing automatic or semi-automatic systems work effectively, they are not completely devoid of problems and inconveniences, especially as they are extremely complex and very expensive and the fact that, when the valve closes, a last drop is formed which can harm the precise metering, dirty the installation and hamper the next operation.

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The purpose of the present invention is to provide a system for metering pasty products, which offers an integral solution to all of these problems and inconveniences.

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Explanation of the invention.-

To this end, the first aspect of the invention is a new module for metering pasty products, as mentioned above, which is basically characterized in that the tank is a hollow prism and the pushing means comprises a vertical-action piston which runs tight within the tank and coaxially with the same, the opening and closing means comprising a lower metering valve, the body of which contains an internal space for a vertical axle which opens into with the tank, the sealing element of the valve being a closing head, which is movable between a maximum open position and a closed position, on which the main base of the seal remains level with the valve outlet, closing the tank.

Said sealing element can be built in to an actuating rod which passes inside said internal cylindrical space of the valve body and which is also activated by a trip dog, counter to the action of a spring.

Preferentially, said closing head is frustoconical and the tank is cylindrical. According to another characteristic of the invention herein, the module comprises a device for purging the air remaining trapped inside the tank below the piston.

In accordance with a preferred embodiment, each module comprises a device for injecting air inside the tank for the actuation of the piston.

The metering module of the invention can comprise a mechanism for opening a container packaging the pasty product, once it is placed inside the tank.

Preferably, said opening mechanism consists of a blade, whose cutting edge is situated on the side of a cylinder which circles, or at least partially circles, the outlet of aforementioned tank.

Preferably, the metering module shall comprise control means for controlling the corresponding measuring of the metering module that must pour pasty products into a vessel, with certain predetermined mixing parameters.

In particular, said control means comprises a microprocessor, a computer and/or a programmable logic controller, supplied with software, and a interface with the user, which activate motor and timer means of the vessel and the metering valves of each of the metering modules.

With respect to a second aspect of the invention, a process for metering pasty products is disclosed, for application in conjunction with a metering module or a mixing system defined earlier, which includes the stage of providing a pasty product in a container packaging with deformable wall, and additional steps of: inserting the closed packaging and filling a tank with the pasty product; making a piston within

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the tank to descend and compress the packaging, with its sides deforming against the inner walls of the tank; and opening the container packaging by opening means, making an opening in the packaging, aligned with the outlet, allowing the pasty product contained in the packaging to exit towards the metering valve, via the subsequent compression of the piston.

Brief description of the drawings.-

Hereafter, a description will be given of a preferred, although not exclusive, embodiment of the invention herein, which is accompanied with drawings to help provide a better understanding, which are purely illustrative and non-limitative in nature, in which:

- Fig. 1 is a section view of a valve of the metering module of the invention herein;
- Fig. 2 is an elevation and part section view of a preferred embodiment of the metering module of the invention herein;
- Fig. 3 is a front-elevation schematic view of a system for mixing pasty products, comprising seven modules like those in Fig. 2;
- Fig. 4 is a side-elevation schematic view of the metering system in Fig. 3;
- Fig. 5 is a view similar to that in Fig. 2, of another embodiment of the invention module, with a packaging of the pasty product inserted in the tank, in the rest position; and
- Fig. 6 is a view similar to that in Fig. 5, but with the piston in its operational position.

Description of a preferred embodiment.-

It can be seen in said drawings that the metering module 1 concerned, for pasty products, for example, for dyes or paints, comprises a cylindrical tank 2, and a piston 4, essentially discoidal, for pushing the pasty product 34 in the tank 2. Some O-rings 19 ensure that the piston is adjusted 4 on the inside of the tank. The piston 4 is moved vertically along an axle 8, using a known method, via a built-in actuating rod 24, and hydraulically or pneumatically operated. The tank 2 sits on a lower base 27, connected to an upper support base 28 and guided by the actuator 24 via columns 23.

The lower central part of the tank 2 opens into an outlet 3, through which a bushing tube passes 29, in the lower end of which is a manual cut-off key 25, followed by a metering valve 5, located on the inside of an end piece 30.

The valve 5 has a valve body 6 with a space inside 7, whose axle 8 is, in this

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case, shown with the vertical axle 8 of the tank 2. This internal space 7 is open to the bushing 29 and, through this, to the inside of the tank 2. The valve 5 has a sealing element 12 made up of a closing head 9, which is preferably frustoconical in shape or in the form of a trumpet, although it may also be spherical.

5 The head 9 can be moved continually between a maximum open position and a closed position (represented in Fig.1), in which the main base 11 of the seal 12 is essentially level with the valve 5 outlet 31, closing the tank 2.

10 The sealing element 12 is built in to an actuating rod 13, which passes inside the aforementioned internal cylindrical space 7 of the valve body 6 and which is actuated by a trip dog 14, counter to the action of a spring 10. The rod 13, and consequently the opening and closing of the valve 5, can therefore be operated mechanically or manually, in this case, for example, via the manual key 25.

15 Fig. 2 shows the metering module 1 for pasty products in the invention with a device for purging the air, which remains trapped inside the tank 2 below the piston 4. In the example embodiment given, such purging device comprises a hydraulic tube 20, connected to a flexible pipe 17 which passes through the piston 4 and has a manual key 21. The tube 20 is connected upstream from the manual key 21, with a relative vacuum-source with respect to the internal pressure of the tank 2.

20 The module 1 also has a mechanism for injecting air inside the tank 2, adapted so that the piston 4 can be separated from the bottom of the tank or from the mass of pasty product in the tank. This injection mechanism also has an air injector 22 linked to another flexible pipe 18 which passes through the piston 4, allowing air to enter inside the tank 2 when the piston 4 is to be separated and which may be trapped in the tank 2.

25 Figs. 3 and 4 show a system for mixing pasty products 100 which has various modules 1, in this case seven, described above.

 The modules 1 are placed consecutively and adjacently in a first horizontal plane with corresponding and essentially aligned metering valves 5, fixed to the vertical element 32 of a support structure 26.

30 The support structure 26 comprises a horizontal table 33, on which there are guides 16 for a receiving vessel 15 for the pasty products 34 contained in the modules 1.

35 On the upper part of the vessel 15 is a loading cell 35 (Fig. 4) and the vessel can be positioned under each module 1 and receive a measured amount of the pasty product contained in the module for mixing the pasty products.

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The system 100 comprises a means of controlling the movement of the receive vessel and of the corresponding metering of pasty products of each metering module 1 that must be poured into the vessel 15, with certain predetermined mixing parameters.

5 Such control means can include a microprocessor, a computer and/or programmable logic controller, with the relevant software, and a conventional interface with the user which, being extensively known, are neither shown nor described in greater detail. The control devices activate a motor and timer of the vessel and the metering valves 5 of each of the metering modules 1.

10 The operational mode of the system for mixing and metering pasty products 100 is as follows. With the tanks 2 of the modules 1 completely or partially full of pasty product, the receive vessel 15 is moved along the guides 16 and is positioned successively below each of the modules 1 whose product is to be used in the mixture required. The vessel 15 can be moved manually or by a motor, in this case with
15 stepped motors which is programmed when to move and stop.

Each time it is positioned below a module 1, the corresponding valve 5 opens via, for example, the manual key 25, with which the dye in the tank 2 in question starts to be poured, until the loading cell 35 detects that the quantity programmed or a quantity sufficiently close to the programmed quantity has been
20 poured, which is when the valve 5 closes and the pouring of the pasty product is stopped. The aforementioned software can take into account the weight of the column of dye remaining between the valve 5 outlet 31 and the vessel 15, to close at the appropriate time in order to add the weight in this column to that detected by the loading cell 35 and to programme the measured amount of dye, within a certain tolerance.
25

This operation is constantly repeated for each of the modules 1 containing dye used in the mixture.

In Figs. 5 and 6 an embodiment of the module 1 of the invention herein is shown. This module 1 is designed particularly to demonstrate the process of the invention in practice.
30

More specifically, the module 1 comprises a mechanism for opening a container packaging 36 with deformable walls, which contains the pasty product 34 for metering, consisting of a blade 37, whose cutting edge 38 is situated on the side of a cylinder which circles at least partially the outlet 3 of the aforementioned tank 2. The
35 blade 37 can be in the form of a half shaft, or half bevel, for example, not with its

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upper edge or blade 38 perpendicular with respect to the axle 8.

The packaging 36, which may be a bag, for example made of a plastic material, with or without seams, or cardboard packaging, contains a measured amount of the pasty product to be administered and is inserted inside the tank 2 of the module 1 (Fig. 1). The packaging 36 could therefore be a recipient made of cardboard or paper whose measurements allow it to fit within the inner prismatic walls of the tank 2.

Once the packaging 36 is inside the tank, for metering the pasty product 34 via the valve 5, all that needs to be done is lower the piston 4, compressing the packaging 36 by collapsing its sides against the inner walls of the tank 2. For the compressing force exerted by the piston 4 to continue, the container packaging 36 is opened by the blade 37, which cuts it, making a opening 39 in the packaging (Fig. 6), aligned line with the outlet 3, to let out the pasty product 34 contained in the packaging 36 towards the metering valve 5, by the subsequent compression of the piston 4.

Once the container packaging is empty 36, all that needs to be done is raise the piston 4, leaving the rest of the packaging 36 empty, so that it can be removed. In this way, an exact and measured quantity of the paste material is administered, without staining the tank walls 2.

An expert skilled in the art will understand that the valve design and, in particular, the shape of the sealing element 12, ensures that the metering of dye with this system produces no drops around the outlet 31. It also significantly reduces wastage of the raw material and consequently the environmental problems related to managing the waste, compared to earlier techniques.

Furthermore, if the packaging material 36 can be recycled, the process in the invention is efficient from an environmental point of view, by minimizing the amount of waste produced.

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CLAIMS

1. Metering module (1) for pasty products, of the type comprising a tank (2) for pasty products, provided with pushing means for pushing the pasty product and opening and closing means, adapted for opening and closing an outlet (3) of the
5 aforementioned tank, characterized in that the tank is a hollow prism and the pushing means comprises a vertical-action piston (4) which runs tight within the tank coaxially to the same, the opening and closing means comprising a lower metering valve (5), the body of which (6) contains an internal space (7) for a vertical axle (8) which
10 opens into the tank, the sealing element (12) of the valve being a closing head (9), which is movable between a maximum open position and a closed position, on which the main base (11) of the seal remains level with the valve outlet (31), closing the tank.
- 15 2. Metering module (1) for pasty products according to claim 1, characterized in that said sealing element (12) is built in to an actuating rod (13) which passes inside said internal cylindrical space (7) of the valve body (6) and which is also activated by a trip dog (14), counter to the action of a spring (10).
- 20 3. Metering module (1) for pasty products according to claim 1, characterized in that said closing head (9) is frustoconical.
4. Metering module (1) for pasty products according to any of the previous claims, characterized in that the tank (2) is cylindrical.
- 25 5. Metering module (1) for pasty products according to any of the previous claims, characterized in that it comprises a device for purging the air which remains trapped inside the tank (2) below the piston (4).
- 30 6. Metering module (1) for pasty products according to any of the previous claims, characterized in that it comprises a mechanism for injecting air inside the tank (2) for the actuation of the piston (4).
7. Metering module (1) for pasty products according to claim 1, characterized in
35 that it comprises a mechanism for opening (37, 38) a packaging (36) containing the

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pasty product inserted inside the tank (2).

8. Metering module (1) for pasty products according to claim 7, characterized in that said opening mechanism consists of a blade (37), whose cutting edge (38) is
5 situated on the side of a cylinder which circles, at least partially, the outlet (3) of the aforementioned tank.

9. Metering module according to any of previous claims, characterized in that it comprises control means for controlling the metering of the pasty products of the
10 metering module (1) that is to be poured into a vessel, with certain predetermined mixing parameters.

10. Metering module according to claim 9, characterized in that said control means comprises a microprocessor, a computer and/or a programmable logic controller, supplied with software, and a interface with the user, which act on motor and
15 timer means of the vessel and the metering valve (5) of the metering module (1).

11. Metering process for pasty products, characterised in that it comprises the steps of : providing a pasty product (34) in a container packaging (36) with deform-
20 able walls; inserting the closed packaging and filling a tank (2) with the pasty product; making a piston (4) within the tank to descend; compressing the packaging (36), by deforming its sides, against the inner walls of the tank; and opening the container packaging by opening means, making an opening (39) in the packaging, aligned with the outlet (3), allowing the pasty product contained in the packaging to exit towards a
25 metering valve (5), via the subsequent compression of the piston (4).